

What is claimed is:

1. An isolated nucleic acid molecule selected from the group consisting of:
  - (a) an isolated canine cDNA or mRNA nucleic acid molecule that hybridizes with a nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:35, and SEQ ID NO:37, under conditions comprising (i) hybridizing in a solution comprising 1X SSC in the absence of nucleic acid helix destabilizing agents, at a temperature of about 37°C and (ii) washing in a solution comprising 1X SSC in the absence of nucleic acid helix destabilizing agents, at a temperature of about 56°C; (b) an isolated nucleic acid molecule comprising an at least 20 consecutive nucleotide portion identical in sequence to an at least 20 consecutive nucleotide portion of a nucleic acid sequence selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:38, SEQ ID NO:40, SEQ ID NO:41, and SEQ ID NO:43; and (c) an isolated nucleic acid molecule comprising an at least 40 consecutive nucleotide portion identical in sequence to an at least 40 consecutive nucleotide portion of a nucleic acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:67, SEQ ID NO:68, SEQ ID

NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:75, SEQ ID NO:76, and SEQ ID NO:77.

2. The nucleic acid molecule of Claim 1, said nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:2,
  - 5 SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:40, SEQ ID
  - 10 NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:75, SEQ ID NO:76, and SEQ ID
  - 15 NO:77.

3. A recombinant molecule comprising a nucleic acid molecule as set forth in Claim 1 operatively linked to a transcription control sequence.

4. A recombinant virus comprising a nucleic acid molecule as set forth in Claim 1.

- 20 5. A recombinant cell comprising a nucleic acid molecule as set forth in Claim 1.

6. A composition comprising an isolated nucleic acid molecule of Claim 1 and a component selected from the group consisting of an excipient, an adjuvant and a carrier.

7. A method to produce a protein encoded by an isolated nucleic acid molecule of Claim 1, said method comprising culturing a cell transformed with a nucleic acid molecule encoding said protein.

8. The method of Claim 7, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule that encodes a protein having an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74.

9. The method of Claim 7, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:17, SEQ ID NO:20, SEQ ID NO:23, SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:38, SEQ ID NO:41, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:50, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:59, SEQ ID NO:62, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:71, SEQ ID NO:73, and SEQ ID NO:76.

10. An isolated nucleic acid molecule selected from the group consisting of:
- (a) an isolated nucleic acid molecule encoding a protein comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74; (b) an isolated nucleic acid molecule encoding a protein comprising an at least 6 consecutive amino acid portion identical in sequence to an at least 6 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:24, SEQ ID NO:33, and SEQ ID NO:36; (c) an isolated nucleic acid molecule encoding a protein comprising an at least 15 consecutive amino acid portion identical in sequence to an at least 15 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:12, SEQ ID NO:27, SEQ ID NO:39, and SEQ ID NO:42; (d) an isolated nucleic acid molecule encoding a protein comprising an at least 42 consecutive amino acid portion identical in sequence to an at least 42 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:30, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74; and (e) a nucleic acid molecule complementary to a nucleic acid molecule of (a), (b), (c) or (d).

11. The nucleic acid molecule of Claim 10, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule that encodes a protein having an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74.

12. A composition comprising an isolated nucleic acid molecule of Claim 10 and a component selected from the group consisting of an excipient, an adjuvant and a carrier.

13. A method to produce a protein encoded by an isolated nucleic acid molecule of Claim 10, said method comprising culturing a cell transformed with a nucleic acid molecule encoding said protein.

14. The method of Claim 13, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule that encodes a protein having an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74.

15. The method of Claim 13, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:17, SEQ ID NO:20, SEQ ID NO:23, SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:38, SEQ ID NO:41, SEQ ID NO:44, SEQ ID NO:47, SEQ ID NO:50, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:59, SEQ ID NO:62, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:71, SEQ ID NO:73, and SEQ ID NO:76.

16. An isolated protein selected from the group consisting of: (a) a protein comprising an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74; (b) a protein comprising an at least 6 consecutive amino acid portion identical in sequence to an at least 6 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:24, SEQ ID NO:33, and SEQ ID NO:36; (c) a protein comprising an at least 15 consecutive amino acid portion identical in sequence to an at least 15 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:12, SEQ ID NO:27, SEQ ID NO:39, and SEQ ID NO:42 and (d) a protein comprising an at least 42 consecutive amino acid portion identical in sequence to an at least 42 consecutive amino acid portion of a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:30, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74.

17. The protein of Claim 16, wherein said protein is encoded by a nucleic acid molecule having a nucleic acid sequence selected from the group consisting of: SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:17, SEQ ID NO:20, SEQ ID NO:23, SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:32, SEQ ID NO:35, SEQ ID NO:38, SEQ ID NO:41, SEQ ID NO:44, SEQ ID NO:47, SEQ ID

NO:50, SEQ ID NO:53, SEQ ID NO:56, SEQ ID NO:59, SEQ ID NO:62, SEQ ID NO:65, SEQ ID NO:68, SEQ ID NO:71, SEQ ID NO:73, and SEQ ID NO:76.

18. The protein of Claim 16, wherein said protein comprises an amino acid sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:9, SEQ ID NO:12, SEQ ID NO:15, SEQ ID NO:18, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:36, SEQ ID NO:39, SEQ ID NO:42, SEQ ID NO:45, SEQ ID NO:48, SEQ ID NO:51, SEQ ID NO:54, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:63, SEQ ID NO:66, SEQ ID NO:69, and SEQ ID NO:74.

19. A composition comprising an isolated protein of Claim 16 and a component selected from the group consisting of an excipient, an adjuvant and a carrier.

20. An isolated antibody that selectively binds to a protein as set forth in Claim 16.

21. A composition comprising an isolated antibody of Claim 20 and a component selected from the group consisting of an excipient, an adjuvant and a carrier.

22. A method to detect an inhibitor of TAg1 activity, said method comprising (a) contacting an isolated TAg1 protein of Claim 16, with a putative inhibitory compound under conditions in which, in the absence of said compound, said protein has TAg1 protein activity, and (b) determining if said putative inhibitory compound inhibits TAg1 protein activity.



23. A method to detect disease in an animal comprising:

(a) contacting an isolated anti-canine TAg1 antibody of Claim 20 with a putative TAg1 protein-containing composition under conditions sufficient to form an immunocomplex between said TAg1 protein and anti-canine TAg1 antibodies; and

5 (b) measuring immunocomplex formation between said anti-canine TAg1 antibodies and said TAg1 protein, if any, in said fluid, wherein the presence of said immunocomplex indicates the presence of disease.